## REMARKS

Claims 1-68 are pending. Claims 1, 2, 4, 6-13, 23, 24, 26, 27, 29-36, 46, 47, 49, 50 and 52-59 stand rejected under 35 U.S.C. §102(b) as anticipated by Opperman et al. (ZA 9602517 A). Claims 14-22, 37-45 and 60-68 stand rejected under 35 U.S.C. §103(a) as obvious over Sanderson et al. (WO 03/018431 A1). Claims 3, 5, 25, 28, 48 and 51 stand rejected under 35 U.S.C. §103(a) as obvious over Opperman in view of Aamodt et al. (U.S. Patent No. 6,325,969).

Applicants acknowledge the withdrawal of Sanderson in support of the rejection of claims 14-22, 37-45 and 60-68 under 35 U.S.C. §102(a), the withdrawal of Opperman in support of the rejection of claims 1, 2, 4, 6-9, 13, 23, 24, 26, 27, 29-32, 36, 46, 47, 49, 50, 52-55 and 59 under 35 U.S.C. §103(a), and the withdrawal of Opperman and Steele et al. (WO 94/10233) in support of the rejection of claims 10-12, 33-35 and 56-58 under 35 U.S.C. §103(a).

Claims 1, 23 and 46 are amended to require an article thickness of between about 5 $\mu$m and 500 $\mu$m. Support for the amendment is provided at paragraph 35 of the specification.

### A. The Present Invention

The present invention is directed, in relevant part, to a gas generating and releasing monolayer article, consisting essentially of between 30.0% and 99.9% by weight of a polymer and between 0.1% and 70.0% by weight of a gas generating solid dispersed in the polymer, the article having a thickness of between about 5 $\mu$m and 500 $\mu$m (claim 1), a gas generating and gas releasing monolayer article comprising between 30.0% and 99.9% by weight of a first polymer and between 0.1% and 70.0% by weight the article having a thickness of between about 5 $\mu$m and 500 $\mu$m (claim 23) and a gas generating and gas releasing article comprising between 30.0% and 99.9% by weight of a first polymer and between 0.1% and 70.0% by weight of a gas generating solid dispersed in the polymer, the article having a thickness of between about 5 $\mu$m and 500 $\mu$m (claim 46). The articles function in the absence of an acid, a polymer that degrades to produce an acid, a compound that generates an acid in response to humidity, a hygroscopic compound, and an oxidant. The articles are of sufficient strength to allow the preparation of self-supporting gas releasing liners, sheets, shrink wraps, and bags (paragraph 24) and films, containers, trays and structured packaging material by melt extrusion methods including

extrusion molding, injection molding, compression molding and blow molding (paragraph 103). As shown in the instant Examples, summarized in the table below, self supporting articles having a thickness of between about 5 $\mu$m and 500 $\mu$m were prepared at ratios of gas generating solid (Sodium Metabisulfite - "$Na_2MB$") to polymer of between 0.19:1 to 0.67:1.

| Example | $Na_2MB$/Polymer Ratio | $Na_2MB$ (wt%) [1] | Thickness ($\mu$m) | Film Size ($cm^2$) |
|---|---|---|---|---|
| 2 (1st film) | 40(2)/(500-80) = 0.19 | 16 | 50 to 110 | 875 |
| 2 (2nd film) | 40/(200-40) = 0.25 | 20 | 50 to 90 | 3000 |
| 2 (3rd film) | 40/60 = 0.67 | 37 | 150 to 180 | 3000 |
| 3 | 40(3)/(1000-120) = 0.14 | 12 | 25 to 75 | not reported |
| 4 | 40(3)/(1000-120) = 0.14 | 16 | 25 to 75 | not reported |
| 5 | 40/(200-40) = 0.25 | 20 | 50 to 100 | not reported |

[1] The weight percent of $Na_2MB$ in the composition.

The articles of the present invention have enhanced gas release characteristics by virtue of the reduced monolayer thickness. For instance, Table 1 of the application presents data for accelerated gas release testing of 20 wt% and 37% wt% $Na_2MB$-loaded films (Example 2, 2nd and 3rd films, respectively) that indicates a release rate in excess of 25 ppm at 7 days as compared to Opperman at Figures 5 and 6 that shows the release rate dropping to below about 20 ppm after about 7 days.

**B. Opperman**

Opperman teaches gas generating devices having a preferred thickness range of 1 mm to 3 mm (1000 $\mu$m to 3000 $\mu$m) (page 4, paragraph 6) comprising a highly plasticized polymer having a plasticizer concentration preferably in the range from 35% to 45% by mass and a sulfur gas-generating particulate phase dispersed therein at a concentration in the range of from 10% to 60% by mass (page 5, paragraphs 3-5), and preferably further comprising about 28% by mass of a humectant (page 4, paragraph 3 and page 5, paragraph 7). Opperman does not describe a preferred polymer concentration so a ratio range of gas generating solid to polymer cannot be calculated. Looking to the Examples, a ratio range of gas generating solid (sodium bisulfite) to polymer (PVC) of between 0.85:1 to 1.78:1 is described. In particular, Examples 1-2 describe

forming a mixture containing 33 wt% sodium bisulfite, 39 wt% PVC powder (a ratio of sodium bisulfite to PVC of 0.85:1), 27 wt% dibutylphthalate plasticizer and 1 wt% stabilizer. The mixture was cast into about 1 mm thick sheets and baked in an oven at 145 °C for 5 minutes. Gas releasing disks having a diameter of 30 mm (about 7 $cm^2$) were then punched out from the sheet. Examples 3-5 describe forming a mixture containing 50 wt% sodium bisulfite, 28 wt% PVC powder (a ratio of sodium bisulfite to PVC of 1.78:1), 19 wt% dibutylphthalate plasticizer, 2 wt% blowing agent and 1 wt% stabilizer. The mixture was cast into about 1 mm thick sheets and baked in an oven at 145 °C for 5 minutes. Gas releasing disks having a diameter of 30 mm (about 7 $cm^2$) were then punched out from the sheet. Thickness is described as influencing the gas release rate and release period, but only in reference to devices having a thickness of 2 mm to 3 mm (page 8, paragraph 3). Device thicknesses of less than 1 mm are not described or suggested.

**C. Rejection Under 35 U.S.C. §102(b)**

Reconsideration is requested of the rejection of claims 1, 2, 4, 6-13, 23, 24, 26, 27, 29-36, 46, 47, 49, 50 and 52-59 under 35 U.S.C. §102(b) as anticipated by Opperman.

Independent claims 1, 23 and 46 (and claims 2, 4, 6-13, 24, 26-27, 29-36, 47, 49, 50 and 52-59 that depend therefrom) now require a monolayer article thickness of between about 5 $\mu$m and 500 $\mu$m (i.e., 0.005 mm to 0.5 mm).

By the present amendment, the claimed range (5 $\mu$m and 500 $\mu$m) and the range described by Opperman (1000 $\mu$m to 3000 $\mu$m) no longer touch at 1000 $\mu$m. "Prior art which teaches a value or range that is very close to, but does not overlap or touch, the claimed range does not anticipate the claimed range" (quoting MPEP §2131.03 (see *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985)). It is therefore submitted that claims 1, 23 and 46, and the claims that depend therefrom, are novel over Opperman.

The Office, at the paragraph bridging pages 6-7 of the instant Office action, stated that Opperman does not require a thickness of at least 1 mm; page 4 paragraph 6 merely describes a preferred thickness of the sheet in the range of 1 mm to 3 mm; and page 8 paragraph 3 teaches that thickness is a result effective variable that influences the $SO_2$ release rate. The Office

appears to be asserting that the Opperman devices inherently have a thickness of less than 1000 $\mu$m. Applicants therefore further submit, *arguendo*, that an article thickness of 500 $\mu$m or less is not an inherent feature in Opperman, and Opperman does not inherently anticipate claims 1, 23 and 46. In particular, to maintain the rejection of the claims, the Office must establish that the claimed thickness is inherent in the Opperman disclosure and provide a "basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." MPEP §2112 quoting *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990). Applicants respectfully submit that the Office has not established that a thickness of 500 $\mu$m or less necessarily flows from Opperman. One of ordinary skill in the art would have expected that high ratios of gas generating solid to polymer would affect mechanical properties such as film strength, and Opperman's high gas generating solid loading (i.e., a high ratio of gas generating solid to polymer) would degrade composition strength and not be suitable for the preparation of self-supporting films having a thickness of 500 $\mu$m or less. Opperman does describe thickness as influencing gas release rate and release period, but only in reference to devices having a thickness of 2 mm to 3 mm (page 8, paragraph 3). Nowhere does Opperman describe or suggest a device thickness of less than 1 mm. "The fact that a certain result or characteristic may occur or be present is not sufficient to establish the inherency of that result or characteristic." Quoting MPEP §2112, see *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). It is submitted therefore that Opperman could not inherently anticipate the claimed article thickness of between 5 $\mu$m and 500 $\mu$m.

It is respectfully submitted, therefore, that claims 1, 2, 4, 6-13, 23, 24, 26, 27, 29-36, 46, 47, 49, 50 and 52-59 are patentable under 35 U.S.C. §102(b) over Opperman.

**D. Rejection Under 35 U.S.C. §103(a) over Sanderson**

Reconsideration is requested of the rejection of claims 14-22, 37-45 and 60-68 under 35 U.S.C. §103(a) as obvious over Sanderson.

Claims 14-22, 37-45 and 60-68 depend from and incorporate the features of claims 1, 23 and 46, respectively, which are free of Sanderson, and are therefore likewise patentable over

Sanderson. In particular, claims 14-22, 37-45 and 60-68 are directed to certain preferred embodiments wherein the gas releasing articles of claims 1, 23 and 46, having a thickness of between 5 $\mu$m and 500 $\mu$m, are cojoined with a second and/or third article. Sanderson describes a moisture-activated sulfur dioxide gas releasing multi-layer device comprising a gas generating matrix containing 10% to 30% by weight of sodium metabisulfite dispersed in a plastisol comprising about 58% by weight polyvinyl chloride ("PVC") polymer and about 40% by weight of a plasticizer (page 8, lines 11-28). Sanderson is silent as to the thickness of their matrix layer. It is respectfully submitted that although Sanderson describes a gas-releasing matrix layer, the highly plasticized matrix of Sanderson is of insufficient strength to form a gas releasing article, as required by claims 14-22, 37-45 and 60-68 (by virtue of the incorporation of the claim 1, 23 and 46 features), and therefore must be supported by a carrier sheet and a cover sheet (page 6, line 11 to page 7, line 7).

Even ignoring that the highly plasticized matrix of Sanderson is of insufficient strength to form a gas releasing article and assuming, *arguendo*, that the claimed article thickness could somehow be said to be inherent in Sanderson, obviousness cannot be predicated on inherency. It is well established that the inherency of an advantage and its obviousness are entirely different questions. That which may be inherent is not necessarily known, and obviousness cannot be predicated on what is unknown.[1] The mere fact that a certain thing may result from a given set of circumstances is not sufficient.[2] By any reading therefore, Sanderson does suggest the claimed gas releasing articles.

It is respectfully submitted, therefore, that claims 1-14, 37-45 and 60-68 are patentable under 35 U.S.C. §103(a) over Sanderson.

---

[1] See *In re Shetty*, 566 F.2d 81, 86, 195 U.S.P.Q. 753, 756-57 (C.C.P.A 1977)(quoting *In re Spormann*, 363 F.2d 444, 448, 150 U.S.P.Q. 449, 452 (C.C.P.A. 1966)). See also *In re Naylor*, 369 F.2d 765, 768, 152 U.S.P.Q. 106, 108 (C.C.P.A. 1966) ("[Inherency] is quite immaterial if . . . one of ordinary skill in the art would not appreciate or recognize that inherent result."); *In re Rijckaert,* 9 F.3d 1531, 1533, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993).

[2] MPEP §2163.07(a) quoting *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999).

**E. Rejection Under 35 U.S.C. §103(a) over Opperman in view of Aamodt (US Patent No. 6,325,969)**

Reconsideration is requested of the rejection of claims 3, 5, 25, 28, 48 and 51 under 35 U.S.C. §103(a) as obvious over Opperman in view of Aamodt (US Patent No. 6,325,969). Aamodt is relied upon for teaching a chlorine dioxide-releasing composition. It is said that it would have been obvious to use a combination of the chlorine dioxide gas generating solids of Aamodt in the device of Opperman.

Claims 3 and 5, 25 and 28, and 48 and 51 depend from and incorporate the features of claims 1, 23 and 46, respectively, which stand as allowable over Opperman under 35 U.S.C. §103(a) (and under 35 U.S.C. §102(b) as argued above). Aamodt describes a first porous paper product impregnated with a first chemical and a second porous paper product impregnated with a second chemical. Upon contacting the first and second paper products, the first and second chemicals react to produce an antimicrobial or biocidal chemical agent such as chlorine dioxide. Aamodt does not overcome the deficiencies of Opperman. In particular, Aamodt does not describe or suggest polymeric articles and does not suggest any advantage to modifying the teaching of Opperman to arrive at the articles of claims 3, 5, 25, 28, 48 and 51, the articles having a thickness of between about 5 $\mu$m and 500 $\mu$m.

It is respectfully submitted, therefore, that claims 3, 5, 25, 28, 48 and 51 are patentable under 35 U.S.C §103(a) over Opperman in view of Aamodt.

**F. CONCLUSION**

In view of the above, the invention defined in independent claims 1, 23 and 46 is respectfully submitted as patentable over Opperman. Claims 2-22, 24-45 and 47-68, which depend directly or indirectly from claims 1, 23 and 46, respectively, are likewise patentable over the cited art for the reasons stated with respect to claims 1, 23 and 46 and by reason of the additional requirements they introduce.

In light of the foregoing, applicants request entry of the amendments and withdrawal of the rejections under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), and solicit allowance of the pending claims. The Examiner is invited to contact the undersigned attorney should any issues remain unresolved.

Respectfully submitted,

James D. Harper, Reg. No. 51,781
SENNIGER POWERS
One Metropolitan Square, 16th Floor
St. Louis, MO 63102
(314) 231-5400

JDH/jmd/lam/axj